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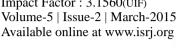
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#### RREARING AND GRAINAGE BEHAVIOUR OF DIFFERENT GERMPLASM ACCESSIONS OF MUGA SILKWORM, ANTHERAEA ASSAMENSIS HELFER, IN ASSAM (INDIA)

#### Biswajit Sramah<sup>1</sup>, Manisha Das<sup>2</sup> & Dinky Mishra (Sarmah)<sup>3</sup>

<sup>1</sup>& Asstt. Prof., Department of Zoology, T.H.B. College, Sonitpur (Assam)

**Abstract :-** Muga silkworm, *Antheraea assamensis*, Helfer., is the producer of Golden Muga silk and is indigenous to the Brahmaputra valley of Assam. Seven accessions of Muga silkworm, *Antheraea assamensis*, Helfer., were collected from different Muga growing areas of Assam and bordering areas, and assigned with accession numbers (AC-1 to AC7). Rearing and grainage performance were studied under natural conditions for 2 years and analysed. Wide range of variability was observed among the populations in terms of rearing and grainage performance. AC-4 was considered as the best performer in both rearing and grainage performance with larval weight 14.5g, ERR 63.5%, Cocoon weight 4.89g in male and 7.26g in female, Shell weight 0.67g, Fecundity 162 nos.. AC-2, AC-5, and AC-7 also exhibited superiority in rearing and grainage performance, which may be utilized for yield of hybrids.

**Key Words:-** Accessions, grainage performance, morphological characterization, rearing performance.

#### INTRODUCTION

The North-East India has been recognized as the centre of Seri-biodiversity in India. The Muga silkworm *Antheraea assamensis*, Helfer. (Phylum-Arthropoda, Class-Insecta, Order-Lepidoptera and Family-Saturniidae) is a multivoltine, polyphagous, semi-domesticated sericigenous insect which produces the golden yellow Muga silk. The silkworm is largely reared in the Brahmaputra valley of Assam (India). Muga silkworm and its host plants are indigenous to North East India (Chaudhury,1981). There was sporadic mention about the occurrence of variants in the natural population of this insect by the works of Chaudhury (1981). Muga culture is practiced on Som (*Persea bombycina*) and Soalu (*Litsea monopetela*) plants. Generally six crops are undertaken in a year. Out of the six there are two commercial crops (Jethua, Kotia), two pre-seed crops (Jarua, Aherua) and two seed crops (Chatua, Bhodia). The abiotic and biotic factors of the environment during different seasons greatly influence the growth and development of Muga silkworm in the form of cocoon weight, pupa weight, shell percentage, fecundity, reelability and denier of the silk (Choudhury, 2003).

Muga silkworms are reared outdoors and are exposed to adverse environmental calamities like high humidity, high temperature, rainfall etc. and leads to heavy loss. Still there is some percentage of survivality in the silkworm populations indicating some variability within and between populations being reared in different areas. Despite tremendous potentialities for healthy growth and development of Muga silk industry through innovation and modernization, a declining trend of this unique industry is clearly manifested over the years. There are valid reasons for this state of affairs. One of the reasons is that Muga silkworm is losing its hybrid vigour and resistance against pests and diseases due to continuous inbreeding depression. Hybridization programme for evaluation of an

Biswajit Sramah<sup>1</sup>, Manisha Das<sup>2</sup> & Dinky Mishra (Sarmah)<sup>3</sup>, "RREARING AND GRAINAGE BEHAVIOUR OF DIFFERENT GERMPLASM ACCESSIONS OF MUGA SILKWORM, ANTHERAEA ASSAMENSIS HELFER, IN ASSAM (INDIA)." Indian Streams Research Journal | Volume 5 Issue 2 | March 2015 | Online & Print

<sup>&</sup>lt;sup>3</sup> Research Scholar, Rajib Gandhi University, Itanagar (Arunachal Pradesh)

improved hybrid strain of Muga silkworm with desired characters is yet to be initiated. Muga culture is practiced by the rural folk of NE region in different localities, and there may be variability on morphological, biochemical, physiological, anatomical and genetic parameters of the silkworm populations spreading over the NE states of India. The present study was made to collect the silkworm populations from different parts of Assam and bordering regions with the prime objectives of conserving the valuable genetic resources and their evaluation for future breeding programme. This paper deals with the rearing and grainage performance of the cultivated Muga silkworm accessions and their evaluation during different seasons.

#### Materials and methods

Seven stocks of Muga silkworms were collected from different prominent Muga growing areas of Assam and bordering regions viz: Mangaldoi, Boko, Tura, Lakhimpur, Goalpara, Jorhat and Kaliapani and were assigned with accession numbers (AC-1 to AC-7). Cocoons were collected from these sites and were brought to the Laboratory (Dept. Of Zoology, Gauhati University, Guwahati, Assam), the dfls (disease free layings) are prepared using standard procedures and with utmost care. 5 dfls for each accession was prepared and kept for hatching. Considering the preference of food plant, the newly hatched worms were reared on Som plantations in the experimental field of the Department. Standard procedures (Chakravorty et al., 2004) were followed for rearing of silkworms and maintaining the host plants. The stocks were maintained separately and continuosly for 2 years (2008-2010). Twelve generations of rearings of each of the silkworm accessions were conducted i.e, 6 rearing seasons per year for 2 years. The 6 Seasons are viz. Season-1 (October-November), Season-2 (December-January), Season-3 (February-March), Season-4 (April-May), Season-5 (June-July), Season-6 (August-September). Morphological study of various stages of the life cycle was done. Rearing and Grainage parameters for all the seven accessions were recorded in all the seasons along with the meteorological data. Mortality of worms due to diseases viz., Flacherie, Grasserie and Muscardine was also recorded. The data obtained for two years were statistically analyzed to determine the significance of the stock for different rearing and grainage parameters. The accessions were then ranked as suggested by Arunachalam and Bandyopadhyay (1984), where a lower value is considered for a desirable character and a higher value for undesirable one.

#### **Results and Discussions**

Variations in the morphological characters of Muga silworm larva, cocoon, pupa and moth are presented in Table 1a to 1d. Variations in the accessions for rearing and grainage parameters are presented in Table 2a & 2b. Effect of rearing seasons on the rearing and grainage parameters are presented in Table 3. Little variations in the qualitative characters among the accessions were seen, while significant differences were observed in the quantitative characters.

Table 1a: Larval characters of different Muga silkworm accessions:

Accession	Length Of Larva	Breadth Of Larva	Weight of Larva
	(mm)	(mm)	(g)
AC-1	7.3-85.9	1.39-15.33	8.2-13.5
AC-2	7.2-85.8	1.3-15.9	9.3-13.8
AC-3	6.5-78.5	1.25-15.8	9.5-13.6
AC-4	7.8-88.6	1.41-16.5	9.5-14.5
AC-5	7.0-87.3	1.5-16.0	9.4-14.0
AC-6	7.0-75.9	1.5-15.7	8.1-12.5
AC-7	7.2-86.6	1.5-16.1	8.7-12.7

Table 1b. Cocoon characters of different Muga silkworm accessions:

Accessio	L:W	ratio	Dod	uncle	Dry Co	vacon	Dry cho	ll weight
n No.	cr			ngth	Weigh			_
n No.	(CI	11)		em)	vv eigi	it (g)	Q	g)
	М	F		F	M	F	M	F
	M	_	M		M	Г	M	Г
AC-1	4.2:1.8	5.1:2.	2.9	3.0	2.105	2.39	0.332	0.467
		1				8		
AC-2	4.7:1.9	5.1:2.	4.6	4.6	1.355	2.41	0.342	0.483
		3				3		
AC-3	4.5:2.1	5.4:2.	3.0	3.1	1.568	2.93	0.350	0.492
		5				0		
AC-4	4.8:2.2	5.4:2.	4.6	4.7	4.890	7.26	0.670	0.551
		8				0		
AC-5	4.3:2.0	5.3:2.	3.6	3.5	1.756	3.12	0.352	0.531
		1				4		
AC-6	4.2:1.9	5.4:2.	3.9	4.0	1.356	2.13	0.353	0.499
		2				5		
AC-7	4.3:1.6	5.3:2.	2.8	2.9	1.322	2.56	0.441	0.537
		3				8		

Table 1c. Pupal characters of different Muga silkworm accessions:

Accession No.	Len (cr		Brea (cr		Pup Weight	
	M	F	M	F	M	F
AC-1	3.6	4.5	1.8	1.7	4.2	5.8
AC-2	3.7	4.6	1.5	2.0	4.8	6.5
AC-3	3.75	4.0	1.6	1.8	4.6	5.2
AC-4	3.8	4.7	1.9	2.1	5.7	7.1
AC-5	2.9	3.9	1.5	2.0	4.9	7.0
AC-6	3.3	4.5	1.6	1.9	4.4	5.9
AC-7	3.7	4.1	1.7	1.8	4.6	6.3

Table 1d. Study of Moth characters of different Muga silkworm accessions:

Table 1d. Study of Moth characters of different Muga silkworm accessions:

Moth Characters				Accessions			
	AC-1	AC-2	AC-3	AC-4	AC-5	AC-6	AC-7
Body colour	Reddish Brown	Brown	Dark Brown	Reddish Brown	Brown	Brown	Brown
Body Length (cm)	2.9-3.5	3.1-3.9	3.1-3.6	3.2-3.8	3.0-3.7	2.8-3.5	2.7-3.5
Wing span (cm)	13.5	15.7	15.3	15.4	15.1	14.8	15.3
Ground colour of remigium	Shaing Brown	Shining Brown	Shamg Brown	Shining Brown	Shining Brown	Shining Brown	Shining Brown
Colour of Ocellus	Black, white and Yellow						
Shape of hyalme spot	oval	evo	०एव	oval	oval	oval	eva
Alignment of A1 &A2 with MC	A1&A2 does not touch MC MC straight						
Moth weight (g)	1.326-3.528	2.135-3.575	2,002-3,159	2.101-3.404	1.843-3.006	2,012-3,423	1,951-3,320

Table 2a. Study of ERR, Mortality of worms, Larval Body Weight, Cocoon weight, Shell weight, SR% and Fecundity of different Muga Silkworm accessions

AC-1 57.56b 13.93f Hacherie Muscardine Male Female Average weight (g) weight (g) (nosh)   AC-1 57.56b 13.93f 14.18bcd 3.67c 9.12abc 11.23d 10.17d 4.98c 0.49d 10.08bc 138.55d   AC-2 56.93c 15.18cde 15.37a 5.36a 8.95b 11.63c 10.29cd 7.21a 0.65ab 9.66d 160.32b   AC-3 54.76d 13.81ef 15.37a 5.36a 8.95bc 11.70c 10.33cd 7.26a 0.65ab 9.90cd 155.05a   AC-3 49.94f 17.45a 14.55b 8.85bc 11.32b 7.26a 0.67a 11.73a 157.53c   AC-5 50.27e 15.91def 15.25ab 4.45b 8.85bc 11.81c 10.24cd 4.60c 0.55bc 10.53b 147.75c   AC-7 55.56cd 16.05bcd 4.06c 9.15ab 11.79c 10.47c 51.6bc 0.55bc 0.55bc 0.55bc<	Accession	ERR	M	Mortality of worms	orms (%)	Larv	Larval Body weight (g)	tht (g)	Сосооп	Shell	SR %	Fecundity
57.56b 13.95f 14.18bcd 3.67c 9.12abc 11.23d 10.17d 4.98c 0.49d 10.08bc   56.93c 13.18cde 13.50de 4.54b 8.95b 11.63c 10.29cd 7.21a 0.65ab 9.66d   54.76d 13.81ef 15.37a 5.36a 8.96bc 11.70c 10.33cd 5.44bc 0.58b 9.90cd   63.53a 8.21h 8.47f 2.37d 9.64a 14.52b 12.08a 7.26a 0.67a 11.73a   49.94f 17.45a 14.65abc 4.45b 8.85bc 13.39a 11.12b 5.85b 0.55bc 10.53b   50.27e 15.91def 15.25ab 4.30bc 8.67d 11.81c 10.4cd 4.60c 0.55bc 9.66d   55.56cd 16.05bcd 13.95cde 4.06c 9.15ab 11.79c 10.47c 5.16bc 0.55bc 9.55e   0.76 0.55 0.47 0.35 0.17 0.15 0.10 0.03 0.05 0.47			Grasserie	Flacherie	Muscardine	Male	Female	Average	weight (g)	weight (g)		(nos.)
56,93c 13.18cde 13.50de 4.54b 8.95b 11.63c 10.29cd 7.21a 0.65ab 9.66d   54.76d 13.81ef 15.37a 5.36a 8.96bc 11.70c 10.33cd 5.44bc 0.58b 9.90cd   63.53a 8.21h 8.47f 2.37d 9.64a 14.52b 12.08a 7.26a 0.67a 11.73a   49.94f 17.45a 14.65abc 4.45b 8.85bc 13.39a 11.12b 5.85b 0.55bc 10.53b   50.27e 15.91def 15.25ab 4.30bc 8.67d 11.81c 10.24cd 4.60c 0.56bc 9.66d   55.56cd 16.05bcd 13.95cde 4.06c 9.15ab 11.79c 10.47c 5.16bc 0.51c 8.95e   0.76 0.55 0.47 0.36 0.17 0.17 0.10 0.03 0.25   1.55 1.03 0.95 0.63 0.35 0.27 0.23 0.07	AC-1	57.566	13.95£	14.18bcd	3.67c	9.12abc	11.23d	10.17d	4.98c	P67'0	10.08bc	138.55de
54.76d 13.81ef 15.37a 5.36a 8.96bc 11.70c 10.33cd 5.44bc 0.58b 9.90cd   63.53a 8.21h 8.47f 2.37d 9.64a 14.52b 12.08a 7.26a 0.67a 11.73a   49.94f 17.45a 14.65abc 4.45b 8.85bc 13.39a 11.12b 5.85b 0.55bc 10.53b   50.27e 15.91def 15.25ab 4.30bc 8.67d 11.81c 10.24cd 4.60c 0.55bc 9.66d   55.56cd 16.05bcd 13.95cde 4.06c 9.15ab 11.79c 10.47c 5.16bc 0.51c 8.95e   0.76 0.55 0.47 0.15 0.17 0.15 0.10 0.03 0.25   1.55 1.03 0.95 0.63 0.35 0.27 0.23 0.05 0.47	AC-2	56.93c	15.18cde	13.50de	4.546	8.95b	11.63c	10.29cd	7.21a	0.65ab	9.66d	160.32b
63.53a 8.21h 8.47f 2.37d 9.64a 14.52b 12.08a 7.26a 0.67a 11.73a 11.73a 49.94f 17.45a 14.65abc 4.45b 8.85bc 13.39a 11.12b 5.85b 0.55bc 10.53b 10.53b 55.56cd 16.05bcd 13.95cde 4.06c 9.15ab 11.79c 10.47c 5.16bc 0.56c 9.66d 0.76 0.55 0.47 0.36 0.15 0.17 0.15 0.10 0.03 0.25 0.47 0.55 0.50 0.35 0.27 0.23 0.05 0.47	AC-3	54.76d	13.81ef	15.37a	5.362	8.96bc	11.70c	10.33cd	5.44bc	0.58b	9.90cd	135.05e
49.94f 17.43a 14.65abc 4.45b 8.85bc 13.39a 11.12b 5.85b 0.55bc 10.53b   50.27e 15.91def 15.25ab 4.30bc 8.67d 11.81c 10.24cd 4.60c 0.56bc 9.66d   55.56cd 16.03bcd 13.95cde 4.06c 9.15ab 11.79c 10.47c 5.16bc 0.51c 8.95e   0.76 0.55 0.47 0.36 0.15 0.17 0.15 0.10 0.03 0.25   1.55 1.03 0.95 0.63 0.35 0.27 0.23 0.05 0.47	AC-4	63.53a	8.21h	3.47£	2.37d	9.64a	14.526	12.08a	7.26a	0.67a	11.73a	162.002
50.27e 15.91def 15.25ab 4,30bc 8.67d 11.81c 10.24cd 4,60c 0.56bc 9,66d   55.56cd 16.05bcd 13.95cde 4.06c 9,15ab 11.79c 10.47c 5.16bc 0.51c 8,95e   0.76 0.55 0.47 0.36 0.15 0.17 0.15 0.10 0.03 0.25   1.55 1.03 0.95 0.63 0.36 0.37 0.23 0.05 0.47	AC-5	49.94£	17.45g	14.65abc	4.45b	8.85bc	13.39a	11.126	5.85b	0.55bc	10,536	157.53c
55.56cd 16.05bcd 13.95cde 4.06c 9.15ab 11.79c 10.47c 5.16bc 0.51c 8.95e 0.76 0.55 0.47 0.36 0.15 0.17 0.15 0.10 0.03 0.25 0.25 0.55 0.55 0.55 0.55 0.55 0.55	AC-6	50.27e	15.91def	15.25ab	4,30bc	8.67d	11.81c	10.24cd	4.60c	0.56bc	9.66d	133.49f
0.76 0.55 0.47 0.36 0.15 0.17 0.15 0.10 0.03 0.25 0.25 0.15 1.03 0.95 0.63 0.30 0.35 0.27 0.23 0.05 0.47	AC-7	55.56cd	16.03bcd	13.95cde	4.06c	9.15ab	11.79c	10.47c	5.16bc	0.51c	8.95e	142.72cd
1.55 1.03 0.95 0.63 0.30 0.35 0.27 0.23 0.05 0.47	S.Edt	0.76	0.55	74.0	0.36	0.15	0.17	0.15	0.10	0.03	0.25	0.75
	CD0.05	1.55	1.03	0.95	0.63	0.30	0.35	0.27	0.23	0.05	0.47	06.0

A figure with common alphabet does not differ significantly

Table 2b. Effect of different seasons on ERR (%), Mortality of worms(%), Larval weight(gm), Cocoon weight(gm), Shell weight(gm), SR% and Fecundity(Nos.)

Season	ERR	Mo	Mortality of worms (%)	(%)	Larval	Larval Body weight (gm)	(gm)	Cocoon	Shell	SR %	Fecundity
	(%)	Grassene	Flachene	Muscardine	Male	Female	Average	weight (g)	weight (g)		(nos.)
Season1	54.39cd	9.97e	18.50b	19.25a	8.67ab	11.95a	10.31a	5.58c	0.56a	9.84a	165.45ab
Season2	56.80c	14.83c	14.48c	0.35c	8.47ab	11.35c	9.91c	5.63b	0.55a	9.70b	153.89c
Season3	63.58a	6.49f	19.95a	0.25c	9.52a	11.25c	10.38a	5.80a	0.57a	9.53c	167.05a
Season4	49.25e	21.50a	6.38f	0.00c	8.91a	11.67b	10.29a	5.46c	0.52c	9.52c	159.87b
Season5	45.10f	19.97b	13.88d	0.000	8.84a	11.66b	10.25b	5.53c	0.53b	9.45cd	160.57b
Season6	60.50b	13.66d	11.03e	6.75b	8.53bc	11.98a	10.25b	5.84a	0.54b	9.29d	160.55b
SECT	0.57	0.35	0.25	0.25	0.15	0.07	80.0	60.0	0.01	0.16	19.0
CD0.05	1.25	0.75	0.55	0.55	0.27	0.13	0.15	0.12	0.02	0.33	0.85

A figure with common alphabet does not differ significantly

Table 3. Ranking of different Muga silkworm accessions based on Rearing and Grainage performance and mortality of worms

	~ ·	япч	5	2	9	-	3	7	4
	Total	2101	7.06	5.12	7.15	2.39	5.93	9.63	6.94
	Fecundity (nos)	(roar)	0.57	0.29	0.81	0.59	0.35	0.85	0.41
	SR %		0.75	0.59	0.61	0.27	0.25	0.87	0.79
	Shell	(gm)	0.89	0.38	0.45	0.16	0.23	0.95	0.58
	Cocoon weight(gm)	1.0	86.0	0.51	0.85	0.21	0.81	86.0	0.57
	(gm)	Avs	0.75	09.0	0.51	0.16	0:30	0.85	0.85
	Larval Body weight(gm)	Female	0.71	0.51	0.75	0.18	0.36	0.73	0.55
	Larval	Male	0.35	0.26	0.32	0.15	0.45	68.0	0.87
t seasons	Mortality of worms (%)	Muscardine	0.65	74.0	0.85	0.23	0.51	0.85	0.51
ig different		Flacherie	69.0	0.45	<i>L</i> 6'0	0.16	0.93	1.00	0.54
due to diseases during differen		Grassenie	0.37	0.61	0.46	0.15	0.95	0.85	0.77
due to d	ERR (%)		0.35	0.45	0.57	0.13	0.79	0.81	0.50
	Accession		AC-1	AC-2	AC-3	AC-4	AC-5	AC-6	AC-7

#### Study of morphological characters:

While studying the egg characters for the different Accessions, no variation in colour, shape, presence or absence of streaks on chorion, shape of follicular imprints and muconeum on chorion was observed. The eggs were brown in colour, oval shaped, without any streaks on chorion, muconeum was present. Larval characters like colour of neonate, type of bristles, body colour, haemolymph colour, integument colour, hardly showed any difference for the Accessions. The weight, length and breadth of larva recorded showed wide variations (Table 1a). The neonate was black in colour with yellow streaks, straight bristles, head capsules were dark brown in colour, the mature larvae is light green in colour and integument is black. Range of larval length from first instar to mature larvae was maximum in AC-4 (7.8-88.6 mm) and minimum in AC-6 (7.0-75.9mm).

The colour of pupae is dark brown in all the Accessions. The maximum in male pupal weight was observed in AC-4 (5.7g) and minimum was observed in AC-1 (4.2g). The maximum in female pupal weight was observed in AC-4 (7.1g) and minimum was observed in AC-3 (5.2g). (Table 1c).

No variation among the Accessions was observed in cocoon colour, shape, texture and nature of floss. But significant variations were observed in dry cocoon weight and shell weight in the Accessions. The cocoons were rough textured, golden yellow in colour, elliptical shaped with glossy floss. The maximum cocoon weight was observed in AC-4 (7.26g in female and 4.89g in male). (Table 1b).

While studying the moth characters no significant variations were observed in body colour (except few), ground colour of remigium, ocellus colour. The antennae were bipectinate and red brown in colour. The highest body length was observed in AC-2 (3.1-3.9cm). The largest wing span was observed in AC-2 (15.7cm). (Table 1d).

#### Study of the Rearing and Grainage Performance

Analysis of variance of two years pooled data for different rearing and grainage parameters is presented in Table 2a. Accession no AC-4 was found superior for ERR (effective rate of rearing), Larval Weight, Cocoon weight, shell weight, and fecundity.

Silkworm loss to a great extent is due to outbreak of diseases (Kakati, 2002). The silkworm suffers loss from bacterial (Flacherie), viral (Grasserie) and fungal (Muscardine) diseases (Chaudhury, 1981; Kakati, 2002). In the study conducted for influence of disease in the accessions it was observed that AC-4 showed the highest resistance towards disease.

The rank of the Muga silkworm accessions by the method of Arunachalam and Bandopadhyay (1984) indicated that AC-4 was the best in terms of rearing and grainage performance. The accessions AC-2, AC-5, and AC-7 also indicated superiority over the others.

#### **Conclusion:**

The germplasm stock collections from different regions and their maintenance in isolation for several generations will help in grouping the stocks based on their performance evaluation. From this study it can be concluded that though there exists little morphological difference among the accessions but there are wide differences in terms of rearing and grainage performance among the accessions. The AC-4 which ranked the best among the accessions, and the accessions AC-2, AC-5 and AC-7 which showed superior behaviour may be included in future breeding programme for evolution of hybrids. Moreover, since, management practices for controlling disease in Muga silkworm culture are found to be ineffective due to outdoor rearing activity, transfer of resistant or tolerant genes is the best alternative. Introduction of such genes in a population may result in many fold increase in cocoon productivity in long run. Search for disease tolerant gene in Muga silkworm may be conducted at molecular level. In this study, AC-4 showed considerable survivality of worms against viral, bacterial and muscardine diseases, which may be considered as base material for future studies.

#### References

- 1. **Arunachalam V. & Bandyopadhyay A. 1984.** A method to make decisions jointly on a number of dependent characters. Indian J. Genet. 44(3): 419-424.
- **2.** Chakravorty R., Barah ,A., Neog K., Rahman S.A.S. and Ghose, J. 2004b. Package of practices for Muga culture, In: Package of practices of Muga, Eri and Mulberry Sericulture for North Eastern Region of India, , Central Muga and Eri Research and Training Institute publ., Central Silk Board, Lahdoigarh, Jorhat, pp.1-23.
- **3.** Chakravorty R., Sarmah M.C., Rahman S.A.S and Sahu, A.K. 2004a. Descriptor for characterization of Muga and Eri silkworm germplasm, In: Descriptor for characterization of Muga and Eri host plants and silkworm germplasm resources, Central Muga and Eri Research and Training Institute publ., Central Silk Board, Lahdoigarh,

- Jorhat pp.63-69. **4. Chaudhury, S.N. 1981.** Muga silk industry. Directorate of Sericulture and Weaving, Guwahati, Assam, .pp 1-81.
- 5.Choudhury, M. 2003. Studies on The Relationship Between Silk Yield, Yield components and Rearing environment of Muga Silk Worm Antheraea assamensis Ww. Sericologia,43(3).pp95-102.
- 6. Kakati P.K. 2002. Adoption of prophylactic measures to contain Muga silkworm diseases, Indian silk, 41 (1):
- 7. Sahu A.K. 2006. Biodiversity of Muga silkworm Antherea assamensis (Helfer). In: Non-Mulberry Silkworm and Host Plant Germplasm- Strategies for Maintenance, R. Chakravorty, K. Neog, K.C. Singh. S.A.S. Rahman and A. Barah (Eds.), pp. 77-87.

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